Allogeneic human neural stem cells for improved therapeutic delivery to peritoneal ovarian cancer.

Journal: Stem Cell Res Ther

Publication Year: 2021

Authors: Rachael Mooney, Wafa Abidi, Jennifer Batalla-Covello, Hoi Wa Ngai, Caitlyn Hyde, Diana Machado, Asma Abdul-Majid, Yanan Kang, Mohamed Hammad, Linda Flores, Greg Copeland, Thanh Dellinger, Ernest Han, Jacob Berlin, Karen S Aboody

PubMed link: 33761999

Funding Grants: CIRM Stem Cell Biotechnology Training Program

Public Summary:
BACKGROUND: Immortalized, clonal HB1.F3.CD 21 human neural stem/progenitor cells (NSCs), loaded with therapeutic cargo prior to intraperitoneal (IP) injection, have been shown to improve the delivery and efficacy of therapeutic agents in pre-clinical models of stage III ovarian cancer. In previous studies, the distribution and efficacy of the NSC-delivered cargo has been examined; however, the fate of the NSCs has not yet been explored. METHODS: To monitor NSC tropism, we used an unconventional method of quantifying endocytosed gold nanorods to overcome the weaknesses of existing cell-tracking technologies. RESULTS: Here, we report efficient tumor tropism of HB1.F3.CD 21 NSCs, showing that they primarily distribute to the tumor stroma surrounding individual tumor foci within 3 h after injection, reaching up to 95% of IP metastases without localizing to healthy tissue. Furthermore, we demonstrate that these NSCs are non-tumorigenic and non-immunogenic within the peritoneal setting. CONCLUSIONS: Their efficient tropism, combined with their promising clinical safety features and potential for cost-effective scale-up, positions this NSC line as a practical, off-the-shelf platform to improve the delivery of a myriad of peritoneal cancer therapeutics.

Scientific Abstract:
BACKGROUND: Immortalized, clonal HB1.F3.CD 21 human neural stem/progenitor cells (NSCs), loaded with therapeutic cargo prior to intraperitoneal (IP) injection, have been shown to improve the delivery and efficacy of therapeutic agents in pre-clinical models of stage III ovarian cancer. In previous studies, the distribution and efficacy of the NSC-delivered cargo has been examined; however, the fate of the NSCs has not yet been explored. METHODS: To monitor NSC tropism, we used an unconventional method of quantifying endocytosed gold nanorods to overcome the weaknesses of existing cell-tracking technologies. RESULTS: Here, we report efficient tumor tropism of HB1.F3.CD 21 NSCs, showing that they primarily distribute to the tumor stroma surrounding individual tumor foci within 3 h after injection, reaching up to 95% of IP metastases without localizing to healthy tissue. Furthermore, we demonstrate that these NSCs are non-tumorigenic and non-immunogenic within the peritoneal setting. CONCLUSIONS: Their efficient tropism, combined with their promising clinical safety features and potential for cost-effective scale-up, positions this NSC line as a practical, off-the-shelf platform to improve the delivery of a myriad of peritoneal cancer therapeutics.

Source URL: https://www.cirm.ca.gov/about-cirm/publications/allogeneic-human-neural-stem-cells-improved-therapeutic-delivery-peritoneal